REMARKS

[0001] Claims 1-12, 14-20 and 22-26 are all the claims presently pending in this application. Claims 1, 11 and 19 have been amended to more particularly define the claimed invention.

[0002] Applicant respectfully submits that entry of the currently amended claims is proper because the currently amended claims will either place the application in condition for allowance or in better form for appeal. Applicant further respectfully submits that no new matter is added to the currently amended claims, nor has the scope of the pending claims changed. Accordingly, no new issues are raised that necessitate a further search of art. Applicant respectfully traverses the rejections based on the following discussion.

I. THE PRIOR ART REJECTION(S)

[0003] Claims 1-7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wiencko, Jr. et al., U.S. Patent No. 6,557,123, (hereinafter "Wiencko"), further in view of Dunn et al., U.S. Patent No. 6,112,255, (hereinafter "Dunn").

[0004] Claim 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wiencko, further in view of Dunn further in view of Minow et al., U.S. Patent No. 6,021,462, (hereinafter "Minow").

[0005] Claims 9-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wiencko, further in view of Dunn further in view of Sasamoto et al., U.S. Patent No. 6,442,711, (hereinafter "Sasamoto").

[0006] Claims 11-12, 14-16, 19-20 and 22-24 stand rejected under 35 U.S.C. §103(a) as

being unpatentable over Dunn, further in view of Wiencko.

[0007] Claims 17-18 and 25-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Dunn, further in view of Wiencko, further in view of Sasamoto.

[0008] These rejections are respectfully traversed in view of the following discussion.

A. The 35 U.S.C. § 103(a) Rejection over Wiencko further in view of Dunn

[0009] The Examiner alleges that Wiencko, further in view of Dunn, makes obvious the invention of claims 1-7.

[0010] The Examiner alleges that one of ordinary skill in the art would have been motivated to modify Wiencko with the teaching from Dunn to form the invention of claims 1-7. Applicant submits, however that these references would not have been combined and even if combined, the combination would not teach or suggest each element of the claimed invention.

[0011] Applicant's traverse the Examiner's rejection since, among other reasons, Dunn discloses logically combining a copy of the second block as it is being written to the location in the second buffer segment with the first block as it is concurrently being read from the mirrored location in the first buffer segment, and rendering said logically combined block available at the device interface in the copyback path, while Applicant's claimed invention maintains a directory of updated data blocks comprising ones of said data blocks that 1) have received a write operation, and 2) where a corresponding write operation to a corresponding redundant storage block has not been made, and only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance.

[0012] More specifically, Applicant submits, that neither Wiencko, nor Dunn, nor any alleged combination thereof, teaches or suggests, "*maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made*," and "*only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*," of Applicant's independent claim 1.

[0013] The Examiner alleges that Wiencko's disclosure at column 1, line 57 to column 2, line 61, and column 3, lines 26-32, disclose Applicant's claimed, "*only updating redundant storage blocks corresponding to said updated data blocks*." However, nowhere in the passages in Wiencko cited by the Examiner, (or specifically identified by the Examiner), and nowhere in Wiencko is there any disclosure of "*updated data blocks comprising data blocks that have 1) received a write operation*," and 2) "*where a corresponding write operation to a corresponding redundant storage block has not been made*," per Applicant's claimed invention. Wiencko discloses and invention directed toward data redundancy methods and apparatuses, but Wiencko fails to disclose the specific claimed feature of Applicant's invention of a directory of including an updated data block where a write operation to a redundant storage block has not been made.

[0014] The Examiner even admits that "[t]he Wiencko, Jr. et al. reference does not teach maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made." Therefore, Wiencko cannot disclose Applicant's above-identified claimed features, "*updated data blocks*," as alleged by the Examiner.

[0015] The Exminer alleges that Dunn discloses "maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made," and cites to Dunn's column 8, line 11 to column 9, line 40. Applicant respectfully traverses the Examiner's rejection over Dunn for the following reasons.

[0016] First, Dunn fails to disclose, and the Examiner fails to address Applicant's claimed "*updated data blocks*," that require, 1) *receiving a write operation*," and 2) "*where a corresponding write operation to a corresponding redundant storage block has not been made*." Applicant's claimed invention supposes a period in time between an updated data block receiving a write operation up until, but not including, a corresponding write operation to a corresponding redundant storage block.

[0017] Accordingly, Dunn fails to disclose Applicant's claimed "*only updating redundant storage blocks corresponding to said updated data blocks*," for the above reason that no updated block is disclosed in Dunn that satisfies Applicant's claim language where "*a corresponding write operation to a corresponding redundant storage block has not been made*."

[0018] Additionally, Dunn fails to disclose Applicant's claimed, "*only updating redundant storage blocks...at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*." This feature of Applicant's claimed invention is important since deferring most of the operations for updating the redundant data to a more convenient time dramatically lessens impact on the foreground performance of the disk array. See Applicant's Specification at paragraphs [0019, 0032-0033]. Therefore, Dunn fails to overcome the deficiencies of Wiencko.

[0019] In summary, Dunn discloses logically combining a copy of the second block as it

is being written to the location in the second buffer segment with the first block as it is concurrently being read from the mirrored location in the first buffer segment, while Applicant's claimed invention maintains a directory of updated data blocks comprising ones of said data blocks that 1) have received a write operation, and 2) where a corresponding write operation to a corresponding redundant storage block has not been made, and only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance.

[0020] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Wiencko and Dunn (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

B. The 35 U.S.C. § 103(a) Rejection over Wiencko further in view of Dunn and Minow

[0021] The Examiner alleges that Wiencko, further in view of Dunn and Minow, makes obvious the invention of claim 8.

[0022] The Examiner alleges that one of ordinary skill in the art would have been motivated to modify Wiencko with the teaching from Dunn and Minow to form the invention of claim 8. Applicant submits, however that these references would not have been combined and even if combined, the combination would not teach or suggest each element of the claimed invention. That is, Dunn and Minow fail to make up for the deficiencies of Wiencko as discussed above.

[0023] The Examiner alleges Minow "teaches wherein if an amount of said updated data

block exceeds a fraction of said data stored in said disk array, said method further comprises only updating said redundant storage blocks corresponding to said updated data blocks."

[0024] However, even assuming *arguendo* that the Examiner's position has some merit, Dunn and Minow fails to teach or suggest, "*maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made*," and "*only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*," of Applicant's independent claim 1. Therefore, Dunn and Minow fail to overcome the deficiencies of Wiencko.

[0025] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Wiencko, Dunn and Minow (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

C. The 35 U.S.C. § 103(a) Rejection over Wiencko further in view of Dunn and Sasamoto

[0026] The Examiner alleges that Wiencko, further in view of Dunn and Sasamoto, makes obvious the invention of claims 9-10.

[0027] The Examiner alleges that one of ordinary skill in the art would have been motivated to modify Wiencko with the teaching from Dunn and Sasamoto to form the invention of claims 9-10. Applicant submits, however that these references would not have been combined and even if combined, the combination would not teach or suggest each element of the claimed

invention. That is, Dunn and Sasamoto fail to make up for the deficiencies of Wiencko as discussed above.

[0028] The Examiner alleges Sasamoto "teaches wherein whenever the load on the disk array is below a threshold value, said method further comprises only updating said redundant storage blocks corresponding to said updated data blocks."

[0029] However, even assuming *arguendo* that the Examiner's position has some merit, Dunn and Sasamoto fails to teach or suggest, "*maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made*," and "*only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*," of Applicant's independent claim 1. Therefore, Dunn and Sasamoto fail to overcome the deficiencies of Wiencko.

[0030] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Wiencko, Dunn and Sasamoto (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

D. The 35 U.S.C. § 103(a) Rejection over Dunn further in view of Wiencko

[0031] The Examiner alleges that Dunn, further in view of Wiencko, makes obvious the invention of claims 11-12, 14-16, 19-20 and 22-24.

[0032] The Examiner alleges that one of ordinary skill in the art would have been

motivated to modify Dunn with the teaching from Wiencko to form the invention of claims 11-12, 14-16, 19-20 and 22-24. Applicant submits, however that these references would not have been combined and even if combined, the combination would not teach or suggest each element of the claimed invention.

[0033] Dunn discloses logically combining a copy of the second block as it is being written to the location in the second buffer segment with the first block as it is concurrently being read from the mirrored location in the first buffer segment, and rendering said logically combined block available at the device interface in the copyback path, while Applicant's claimed invention maintains a directory of updated data blocks comprising ones of said data blocks that 1) have received a write operation, and 2) where a corresponding write operation to a corresponding redundant storage block has not been made, and only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance.

[0034] More specifically, Applicant submits, that neither Dunn, nor Wiencko, nor any alleged combination thereof, teaches or suggests, "*determining which of said data blocks comprise updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made*," and, "*only updating redundant storage blocks corresponding to said updated data blocks of said first disk at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*," of Applicant's independent claim 11, and similarly independent claim 19.

[0035] The Exminer alleges that Dunn discloses "maintaining a directory of updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write

operation and a corresponding write operation to a corresponding redundant storage block has not been made," and cites to Dunn's column 8, line 11 to column 9, line 40. Applicant respectfully traverses the Examiner's rejection over Dunn for the following reasons.

[0036] First, Dunn fails to disclose, and the Examiner fails to address where Dunn discloses Applicant's claimed "*updated data blocks*," that require, 1) *receiving a write operation*," and 2) "*where a corresponding write operation to a corresponding redundant storage block has not been made*." Applicant's claimed invention supposes a period in time between an updated data block receiving a write operation up until, but not including, a corresponding write operation to a corresponding redundant storage block.

[0037] Accordingly, Dunn fails to disclose Applicant's claimed "*only updating redundant storage blocks corresponding to said updated data blocks*," for the above reason that no updated block is disclosed in Dunn that satisfies Applicant's claim language where "*a corresponding write operation to a corresponding redundant storage block has not been made*."

[0038] Additionally, Dunn fails to disclose Applicant's claimed, "*only updating redundant storage blocks...at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*." This feature of Applicant's claimed invention is important since deferring most of the operations for updating the redundant data to a more convenient time dramatically lessens impact on the foreground performance of the disk array. See Applicant's Specification at paragraphs [0019, 0032-0033].

[0039] The Examiner admits that Dunn fails to teach or suggest, "monitoring disks in said disk array for predicted disk failures and if a first disk is predicted to fail in said disk array, only updating redundant storage blocks corresponding to said updated data blocks of said first disk."

[0040] The Examiner alleges that Wiencko's disclosure at column 1, line 57 to column 2, line 61, and column 3, lines 26-32, discloses Applicant's claimed, "*only updating redundant storage blocks corresponding to said updated data blocks*." However, nowhere in the passages in Wiencko cited by the Examiner, (or specifically identified by the Examiner), and nowhere in Wiencko is there any disclosure of "*updated data blocks comprising data blocks that have 1) received a write operation*," and 2) "*where a corresponding write operation to a corresponding redundant storage block has not been made*," per Applicant's claimed invention. Wiencko discloses and invention directed toward data redundancy methods and apparatuses, but Wiencko fails to disclose the specific claimed feature of Applicant's invention of a directory of including an updated data block where a write operation to a redundant storage block has not been made. Therefore, Wiencko fails to overcome the deficiencies of Dunn.

[0041] In summary, Dunn discloses logically combining a copy of the second block as it is being written to the location in the second buffer segment with the first block as it is concurrently being read from the mirrored location in the first buffer segment, while Applicant's claimed invention maintains a directory of updated data blocks comprising ones of said data blocks that 1) have received a write operation, and 2) where a corresponding write operation to a corresponding redundant storage block has not been made, and only updating redundant storage blocks corresponding to said updated data blocks at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance.

[0042] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Dunn and Wiencko (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

E. The 35 U.S.C. § 103(a) Rejection over Dunn further in view of Wiencko and Sasamoto

[0043] The Examiner alleges that Dunn, further in view of Wiencko and Sasamoto, makes obvious the invention of claims 17-18 and 25-26.

[0044] The Examiner alleges that one of ordinary skill in the art would have been motivated to modify Dunn with the teaching from Wiencko and Sasamoto to form the invention of claims 17-18 and 25-26. Applicant submits, however that these references would not have been combined and even if combined, the combination would not teach or suggest each element of the claimed invention. That is, Wiencko and Sasamoto fails to make up for the deficiencies of Dunn as discussed above.

[0045] The Examiner alleges that Sasamoto discloses "teaches wherein whenever the load on the disk array is below a threshold value, said method further comprises only updating said redundant storage blocks corresponding to said updated data blocks."

[0046] However, even assuming *arguendo* that the Examiner's position has some merit, Wiencko and Sasamoto fails to teach or suggest, "*determining which of said data blocks comprise updated data blocks, said updated data blocks comprising ones of said data blocks that have received a write operation and a corresponding write operation to a corresponding redundant storage block has not been made*," and, "*only updating redundant storage blocks corresponding to said updated data blocks of said first disk at a time when the disk array is relatively idle, thereby reducing impact on foreground disk array performance*," of Applicant's independent claim 11, and similarly independent claim 19. Therefore, Wiencko and Sasamoto fails to overcome the deficiencies of Dunn.

[0047] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Dunn, Wiencko and Sasamoto (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

II. FORMAL MATTERS AND CONCLUSION

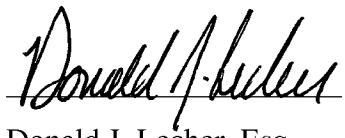
In view of the foregoing, Applicant submits that claims 1-12, 14-20 and 22-26, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 09-0441.

Respectfully Submitted,

Date: October 31, 2008



Donald J. Lecher, Esq.
Registration No. 41,933

GIBB & RAHMAN, LLC
2568-A Riva Road, Suite 304
Annapolis, Maryland 21401
Voice: 410-573-6501
Fax: 301-261-8825
E-mail: Lecher@gibb-rahman.com
Customer No. 29154